

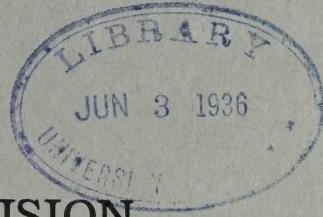
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Canada, Mines, Bureau of Explosives
"Division"

CANADA
DEPARTMENT OF MINES
HON. T. A. CRERAR, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER
EXPLOSIVES DIVISION
LT.-COL. G. OGILVIE, CHIEF INSPECTOR

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ANNUAL REPORT
OF THE
EXPLOSIVES DIVISION



OF THE
DEPARTMENT OF MINES

FOR THE CALENDAR YEAR

1935



OTTAWA
J. O. PATENAUME, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1936

No. 39

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DEPARTMENT OF MINES
HON. T. A. CRERAR, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER
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ANNUAL REPORT
OF THE
EXPLOSIVES DIVISION OF THE DEPARTMENT OF MINES
FOR THE CALENDAR YEAR 1935
BY
Lt.-Col. G. Ogilvie, C.M.G.

The following report deals with the administration of the Explosives Act during the year ending December 31, 1935.

MANUFACTURE OF EXPLOSIVES

Licences for the ten factories in operation at the end of the year 1934 were renewed to cover the manufacture of explosives and fireworks during 1935. A list of these factories is given in Appendix A.

The Toronto Fireworks Co., Ltd. ceased operations in August, and the buildings and equipment were removed.

Inspectors of the Division made 35 visits of inspection during the year, and found close attention being given to the observance of the regulations and terms of licences. In the course of these visits the matters which came under consideration in the explosives factories frequently included minor changes in manipulation, which had been proposed by the men for the furtherance of safety. Such suggestions are welcomed by the managements, and are indicative too of the informed workers' appreciation of the operation rules made in the interests of their safety.

A statement of the yearly production of explosives is given in Appendix B. This shows a slight increase in the production of general commercial blasting explosives and a decrease in manufactured fireworks.

There are no accidents in the course of manufacture of explosives in licensed factories to record.

MAGAZINES

An increase of 10 is recorded in the number of magazines in use, 358 being under licence at the end of the year. Activity in construction operations was reflected in the granting of 206 licences for temporary magazines, an increase of 9 on the number granted during the year preceding.

The quantity of explosives found in a deteriorated condition, and condemned, showed an appreciable decrease. Approximately 1,250 pounds of dynamite, distributed over 18 magazines, were destroyed, as well as

the 150 pounds noted in the last report as having been held over for destruction in the spring. Only four of these magazines belonged to dealers, and most of the condemned explosives in them had been returned by customers. The others were magazines maintained in connexion with construction and logging operations, and so more liable to contain small supplies returned by working parties after having been affected by exposure. As deterioration may not be marked at the time of return, the effect of the moisture absorbed becoming apparent only after a further period of storage, it is always advisable that returned dynamite, although accepted for storage in a magazine, should be well watched thereafter for signs of deterioration.

It is the custom at some camps to improvise thaw houses to which cases are taken, a few at a time, from the magazine, opened, and the contents spread out for thawing before being moved to the place of work. The temporary nature of the operations and the few facilities usually available practically preclude the building of fully satisfactory thaw houses, such as may be found at permanent mine workings, but the crude expedient of merely placing a stove in the middle of a cabin, and spreading the dynamite cartridges on the floor near the walls, must be classed as a highly dangerous practice. It should always be feasible at least to place a covered stove in an annex or compartment, completely cut off from the main part of the cabin by a spark-proof screen, and to provide benches on which to place the dynamite. Whether thawing is necessary is a matter for the user to decide, but with the low-freezing explosives made in recent years it should seldom be necessary to have recourse to thawing. The tendency to continue the custom of earlier years probably accounts for a good deal of it.

Inspectors of the Division made 372 inspections of magazines and 260 were made by deputy inspectors of the Royal Canadian Mounted Police. The co-operation of these latter is essential to the adequate surveillance of the magazines even in the settled areas, and is of particular service in the inspection of magazines which may be in use only for short periods and which could be reached, economically, only by the patrols from the nearest police detachments. The inspections of magazines in the Yukon Territory and in the Northwest Territories were carried out by the police patrols, and the magazines at Great Bear Lake were under the inspection of a Deputy Inspector of Explosives of the Dominion Lands Branch.

THEFTS OF EXPLOSIVES

Thirty cases were stolen from two neighbouring temporary magazines, used in connexion with construction work, but were recovered, the thief being convicted and sentenced to thirty days' imprisonment. However, with this exception, the quantities of explosives taken from magazines were usually small. Twelve magazines were forcibly entered, two of them twice, and dynamite, to a total amount of 502 pounds, as well as 2,125 detonators and 700 feet of safety fuse stolen. Three of the lots stolen were recovered, in whole or in part. The finding of one of these by the provincial police led to the arrest of the thief who was sentenced to three months'

imprisonment. In another case, precautionary measures having been taken by the Royal Canadian Mounted Police in respect to a magazine previously entered, a man was arrested in the act and sentenced to three years' imprisonment.

When a magazine is broken into, the licensee should report the occurrence to the department as well as to the local police. He does not always do so, but prompt notification of loss may be of considerable assistance to the police in the difficult task of tracing the thief, although in the case of magazines, not necessarily visited daily, some time may elapse before the loss is discovered. While cases of theft are dealt with by provincial and municipal police, the related questions of the measures taken for security and of the disposal of the stolen explosives are of interest to those engaged in the enforcement of the Explosives Act.

There are probably more instances of theft from private users of explosives and small working parties than are observed in the press despatches or which are brought to notice otherwise, but it was noted that arrests were made in two cases of theft from working parties, and sentences of 60 days and 6 months imposed. One youth was given suspended sentence for theft from a private user. In another case the theft of about eighty detonators, three dynamite cartridges and a roll of fuse, was traced to a 13 year old boy who had successfully fired and exploded part of a cartridge, then amused himself by exploding the detonators one by one. Fortunately for himself he had made close observation of the methods of a powder man and, chastened by the parental correction received, there is little fear of his escapade being repeated.

EXPLOSIVES ABANDONED

During 1934 a Royal Canadian Mounted Police patrol from the detachment at Arctic Red River, N.W.T., located an abandoned magazine which was found to contain fifteen cases of dynamite. On investigation it became apparent that this magazine had been established, several years ago, by prospectors who had not remained long in the district. The presence of these old explosives was a menace to the public safety even in a sparsely populated region and, when a report on the magazine was received in 1935, instructions were given for their destruction. The police detachment effected this by burning, after clearing the bush around the magazine, and taking precautions against the outbreak of a bush fire and the risks attendant on a possible explosion. There was, however, no explosion.

Another Royal Canadian Mounted Police detachment, at Fort Frances, Ontario, received information to the effect that there was a magazine, on an old mining property about 100 miles east of Fort Frances, with about a ton of dynamite. Investigation was made and the magazine building was found, in a very broken down state and containing approximately 6,250 pounds of dynamite. The case markings showed the dynamite to have been made in 1912, and according to local report the mine had not been in operation since that year. The corporal in charge of the detachment enlisted assistance for picketing the approaches, then destroyed the building and contents by burning. There was no "en masse" explosion, but a few light explosions were heard.

The police also destroyed, by burning, fifteen cases of old explosives which had been temporarily abandoned by lumbermen in Quebec province with a view to subsequent destruction.

Visiting two abandoned claims at McLeod's Bay, B.C., Lieut.-Colonel F. E. Leach, inspector of explosives, found, and destroyed 125 pounds of stumping powder and 100 detonators. The stumping powder was in bad condition and had probably lain abandoned since 1923, which was the year of its manufacture.

Demolition of a house on the old Bankhead (Alberta) townsite was stayed when explosives were found between the ceiling of an upper room and the loose floor boards of the attic. Operations were renewed with the Royal Canadian Mounted Police assisting, and 138 cartridges of "Monobel," 77 detonators, and some safety fuse were recovered. One of the cartridges was primed. The house had not been occupied since it had been used as a rooming house in 1922. The explosives were destroyed by the police.

It is conceivable that a miner, in the hurry of departure, may have forgotten the explosives, if he had had them in his possession for some time, and the selection of such a place for their keeping, however reprehensible, is not altogether inconsistent with the known casual practices sometimes followed by old powder men, but the abandonment of considerable quantities of explosives, in the bush or in the neighbourhood of worked out mines, cannot be attributed to forgetfulness.

Carelessness on the part of persons having only a limited use for explosives is probably accountable for the small quantities which, occasionally, are picked up in various places. Thus a couple of dynamite cartridges and a tin of detonators were found in a vacant house, previously occupied by an employee of an oil well company; three detonators were discovered under the runway of a grain elevator; a dynamite cartridge was picked up in a vacated garage; two others and nine feet of fuse were found near a road by a ten year old boy who, sensibly, reported his find; twenty-two were found in the bush near a highway on which a construction party had been working several years before; a woman handed over to the police eight which she had picked up near a city marketplace and three were brought to light by workmen when making structural alterations to a city house.

UNLICENSED PREMISES

In a few cases, recorded elsewhere, recourse was had to prosecution to enforce observance of the regulations relating to the storage of small quantities of explosives and to the keeping of records of receipts and issues of explosives, including cartridges for rifles and pistols, but, as a rule, minor irregularities are rectified promptly on attention being called to them by an inspector. Indeed, with relatively few exceptions, dealers appreciate the purpose of the regulations and comply well with their requirements. The intermittent users of explosives, engaged in minor operations, are not so easily reached in the course of routine inspections, but, wherever they have been encountered by inspectors or by the Royal Canadian Mounted Police, their practices in the handling of explosives have

been observed and instructions in the regulations given when necessary. The effectiveness of this surveillance has been advanced greatly by the wider distribution of the police detachments maintained during the last few years, and is made manifest by the attention now given, by the large majority of such users of explosives, to the safe keeping of the explosives in their charge.

The provision of locked receptacles for the keeping of explosives lessens the risk of these explosives being involved in an accident while work is in progress and is a preventative against theft, yet, as an added deterrent to the mislaying or theft of the explosives, with their unlawful use or accidental explosion as a possible sequel, a careful check should be kept of the disposal of the small quantities taken from place of storage to place of use. Omission of this control would account for the occasional finding of stray dynamite cartridges, or of detonators, long after work has ceased.

Neglect to keep explosives in locked receptacles appears to be more common in the case of persons who have small quantities for their own use, in or about their dwellings, and each year this must be ascribed as the primary cause of a number of accidents. Usually such cases come to light only after an accident or when some small boy is found with explosives in his possession, but sometimes are disclosed when the police have occasion to visit a dwelling on a search, or for other purposes. In one house so visited, and in which there was no reason to suspect the presence of explosives, about 200 loose sticks of dynamite were found in a room. In another, a two-roomed shack occupied by a man, his wife and three children, nine sticks of dynamite were lying on the floor. They had been given to the man by a grave-digger to keep for him until he next required them, the shack being conveniently near to the cemetery in which he was working. These may be extreme cases, but such thoughtless practices as leaving explosives in cellar or barn and not locked up, to which reference has been made in previous reports, apparently still persist. An even stranger repository for explosives was found by three hunters when they sought shelter in a miner's cabin, temporarily unoccupied. They had lit a fire in the stove and taken off their wet clothes to dry, when a smell of charring wood led to investigation. On opening the oven door they saw smoke coming from the wood and sawdust of a case of dynamite, alongside of which lay a tin of detonators. The November night was passed in the safety of the open.

Inspectors of the Division made 688 inspections of unlicensed premises and about 2,300 were made by deputy inspectors of the Royal Canadian Mounted Police.

IMPORTATIONS

The importations of explosives during the year, of which a statement is given in Appendix C, did not differ very greatly in nature or quantity from those made in recent years. A continued increase is noted in the quantity of nitrocotton imported for use in the manufacture of lacquers, and a considerable increase also in the nitroglycerine for use in the oil fields.

Approximately 75 per cent of the fireworks imported were from China, and of those presented for importation only 2 per cent were rejected. This gratifying continuance of the improvement previously recorded is evidence of real effort having been made by the shippers to eliminate from consignments for Canada, fireworks containing unauthorized composition. The rejections of fireworks from other sources were in the same proportion. These were not attributable to variations in the products but, generally, to the manufacturers or importers neglecting to ensure that the fireworks offered for sale, or ordered, were authorized. In consequence of this, shipments are sometimes presented made up of several varieties of fireworks, some of which are found not suitable for authorization.

The importations were made under the authority of 441 permits and 34 special permits.

AUTHORIZATION OF EXPLOSIVES

Authorization was given for the manufacture of three new explosives, and for changes in the composition of ten others. Twenty-three varieties of fireworks were submitted for examination and eleven were authorized. Check examinations were made of eleven high explosives.

The Dominion Analyst at Vancouver examined 112 samples of fireworks taken from shipments presented for importation through that port, and 36 from shipments at ports of entry in eastern Canada were examined at Ottawa. In all, 10 were found unacceptable and entry refused for the shipments, or part shipments, represented by these samples.

PROSECUTIONS

A contractor was convicted on a charge of keeping explosives in excess of the quantity allowed to be kept in unlicensed premises, and fined. Proceedings, also resulting in conviction and imposition of fines, were taken against another for two violations of the regulations relating to the keeping of small quantities of explosives, the explosives not having been in locked receptacles, and detonators and dynamite having been kept together.

A private user of explosives, who had about 100 pounds of dynamite in his house, was fined for violation of the regulations relating to the keeping of small quantities of explosives.

Four dealers were fined for failure to keep records of their receipts and issues of cartridges for rifles and pistols.

Reference has been made to a few convictions following charges of theft laid by provincial or municipal authorities, and it may be of interest to note that information was received, also, of two cases where sentences of imprisonment were given for unlawful possession of explosives.

ACCIDENTS

In Conveyance. No reports were received of accidents occurring in the conveyance of explosives.

In Use. A reduction in the figures for the year 1934, of 30 per cent in the number of accidents, and a greater reduction in the number of persons

injured, was accompanied, unfortunately, by an increase in the number of fatalities in the use of explosives which rose from 30 in 1934 to 38 in 1935.

An accident which leads to loss of life naturally is impressed more deeply on the mind than one which is the cause of only a minor injury, but as the consequence of an accident, when one does occur, is so much a matter of chance, the causes of all accidents are equally worthy of study when the possible reduction of avoidable accidents comes under consideration. Many could not be avoided by any human foresight; others could not be classed with any certainty as avoidable or unavoidable, but it is certain also that many are brought about by the taking of wholly unnecessary risks. Some of the causes cited in Appendix D are at least suggestive of this. Avoidable accidents were, however, more in evidence in 1934, and it is encouraging to note that success followed the adoption of the measures taken by the provincial departments of Ontario and Quebec towards the reduction of these. This gives ground for the hope that further reduction will reward sustained effort.

In Mines and Quarries. Accidents connected with the use of explosives in mines and quarries caused the death of 22 men and injury to 65 others, while the casualties for the five years preceding averaged 13 killed and 63 injured. One disastrous explosion in the Allan Shaft Mines, Nova Scotia, on April 16, took toll of seven lives. From particulars given through the courtesy of the Deputy Minister of Mines, Nova Scotia, it is evident that a gas ignition followed the firing of a shot. The bodies of four of the victims, including that of the shot-firer, were found, badly burned, at a distance of about 120 feet from the face. The other three men had apparently been overcome by after-damp. It transpired that some of the shot holes had been bored a considerable distance into the solid beyond the mining, thereby greatly increasing liability to a blown out shot, and consequently also risk of a gas ignition. Another contributory factor was detected when a lot of folding was observed around where the level was being driven, indicative of what the miners term "types," and it is probable that gas was liberated when these were brought down by the concussion.

The causes of the accidents are indicated by the sub-heads under which they are classified in the table (Appendix D), but it may be of advantage to examine briefly the circumstances attending some of those attributed to "prematures and failing to get away from the shot hole" as there have been several accidents of this class, and as interest lies in the reason why there was delay in getting clear. When a round of shots is to be fired allowance is made for the time required to light all fuses. However, difficulty may be experienced in lighting them, particularly under wet conditions, thereby delaying the operation. A good precautionary measure, often adopted, is taken in the use of fuse lighters, or of "spitters" of notched fuse, so that when these go out the firer knows that he should leave. Even so, in one case at least, the firer had recourse to his lamp for lighting after his spitter had burned out, and sustained injuries. Other two cases of delay in spitting fuses, with a strong presumption of unheeded warning, led to the loss of four lives. When a lamp is used any delay in lighting may well be underestimated by the shot-firer, and two accidents

are recorded, each causing the death of one man and injury to another, due to delay when so lighting a round.

The use of short fuses still persists to some extent. One man was killed and four men were injured in four accidents through failure to get away from the shot hole because of this practice. In another case a man was injured when he, having lit his fuse and moved away, returned to pick up a forgotten container. A similar accident occurred when, after lighting the fuses, and descending a 25-foot ladder to the floor of the drift, a miner remarked to his companion that there was "lots of time" to return and loosen a sprag on which they had been standing. He was killed and his mate injured.

Elsewhere than in Mines and Quarries. A welcome reduction has been effected in the frequency of accidents occurring in the use of explosives in road construction, and other general operations, which was subject of comment in the last report. This reduction is not reflected in the number of fatalities but in the number of persons injured, there having been 16 killed and 60 injured in 1935, and 15 killed and 107 injured in 1934. The decrease in number of casualties is particularly noticeable in those due to "projected debris" and "failing to take cover," and is mostly due to the reduction effected in Ontario by the insistence of the Department of Northern Development on proper precautions being taken by the many working parties under its direction.

Accidents due to other causes involve, usually, the shot-firers and their helpers, if any, and, while experience by no means brings immunity from such accidents, the appearance of occasional users of explosives among the victims becomes more pronounced. Thus, of the 14 recorded deaths, six were of farmers, one of a lumberman, and one of a railwayman. A like incidence is not found among the injured, which is doubtless due to occasional users often working alone, and to the greater chance of an accident in preparing, loading, and firing a charge proving fatal. The information obtained on accidents in the general use of explosives, other than those to men in industrial or governmental employment, is sometimes insufficient for the determination of the causes: for example the fatalities shown as due to "various" causes include two about which it can be said only that the accidents occurred to farmers when blasting stumps. In some other cases the particulars available are just sufficient to enable the cause to be ascribed in the general terms given. It may be of interest, however, to note that the use of short fuses was the primary reason why four men were injured when they "failed to get away." "Returning too soon" also appears frequently as a cause of accident. There is a striking sameness in most of the accounts of these—the shot-firer either thought his shot had misfired and returned to relight the fuse, or he had lit two fuses and then noticed one was not properly lit, or so believed, and, returning to relight it, was caught by the blast.

As has been remarked experience does not bring immunity. In illustration of this may be mentioned the case of a man, of many years' experience, who met his death while preparing charges under conditions that certainly were not favourable for the careful manipulation of explosives. He was fixing fuses in detonators while walking and holding the

tin of detonators in his hand, when some mischance brought about the explosion of all the detonators. Again, another powder man of long experience, seated himself about 8 feet from an open fire and cut short lengths of fuse which he laid on the ground beside him and near a tin containing about 80 detonators. He then proceeded to fix detonators on the fuses, crimping them with his teeth. A spark from the fire is believed to have ignited one of the fuses on the ground, and immediately thereafter the detonators in the tin exploded. In his excitement the man threw a number of detonators, which he had had in his left hand while crimping, into the fire. He received many minor injuries, but, luckily, none of permanent effect.

Special interest attaches to one of the accidents which occurred in the use of explosives (classed under the subhead of "various" in the Summary) by reason both of the unusual circumstances which led to it, and of its tragic consequence. Mr. J. Cole of the Technical Staff of the Canadian Industries, Ltd., and Mr. H. M. Roscoe, district manager at Halifax, both well known to users of explosives throughout the Dominion, assisted by Mr. Wm. Pitcher of the same company and Mr. W. Leighton, magazine keeper, were engaged, on July 25, in clearing the site of the old Acadia Powder Factory near Waverley, N.S., of any residual nitroglycerine. They were doing this by placing and firing small shots in the ground, when the explosion occurred which took the lives of the three first named. Similar operations had been carried out on the sites of other old factories in pursuit of a policy of clearing the properties of any possible explosives risks. It may be explained that, while in modern factories the manner in which spent acids and washwaters from nitroglycerine houses are dealt with eliminates the chance of absorption of nitroglycerine in the ground, a common earlier practice was, as in this case, to run the washwaters by gutter to a lake alongside of which the factory was placed. Although the quantity of nitroglycerine in the waste would be extremely small, in time, an appreciable amount might be held in the ground. At other factory sites a few blasts had served to explode any nitroglycerine so remaining, only minor explosions resulting. In this case, however, the firing of a shot at the outlet of an old gutter brought about an explosion in which, judging by its effect, several tons of nitroglycerine must have been involved. Two craters were formed, each about 50 feet wide and 25 feet deep. These, adjoining, made in plan a rough "figure of eight" of overall length of 150 feet.

The Acadia Powder Company was one of the first two powder companies to operate in Canada, both it and the Hamilton Powder Company having been formed in 1862. About the year 1881 the factory was extended to provide for the manufacture of dynamite. Very little is known of its early operations, but it is at least sadly evident now that at first the waste from a nitrating house had been run to a sort of cesspit in the upper loop of the "figure of eight" and only later had it been run by gutter from the house to the lake. It may be assumed, also, that in those early years of manufacture a less efficient separation resulted in more nitroglycerine being held in the spent acids. The recovery of that, and of the nitroglycerine in the washwaters, would not have been regarded

as economical, and consequently an appreciable quantity must have been run off with the waste from each charge resulting, after many years of operation, in an extraordinary accretion of nitroglycerine.

With no reason to suspect the presence of nitroglycerine to an amount greatly exceeding that encountered elsewhere, the unfortunate victims had been guided by their previous experiences in the selection of a place of observation under cover, and were overwhelmed by the debris. The magazine keeper, who had with him the small supply of explosives required for the operations, had been sent to a greater distance and escaped injury.

Miscellaneous Accidents. Brief notes on the circumstances, so far as they are known, attending the miscellaneous accidents are given in the appendix. The casualties resulting from these, 5 persons killed and 48 injured, show only a slight diminution in the average number of injured during the preceding five years. Accidents with fireworks bulk more largely than usual, but it is probable that each year there are many of these, attended by relatively minor injuries, which do not come to notice. One of the accidents classed as "various" caused the death of three men when dynamiting fish, but the others are more suggestive of misadventure not associated with any blameworthy or particularly careless action.

The few classed as playing with explosives contained more that was suggestive of tampering with explosives notwithstanding a knowledge of the risks involved, than of thoughtless playing with explosives casually obtained. Some of these accidents no doubt might have been avoided had the explosives been kept in proper security, but failure in this respect is more strongly indicated in the record of accidents with detonators. Fortunately none of these, this year, has had fatal consequences, but 23 persons have been injured. The loss of fingers is common, and one deplorable accident led to loss of sight.

During the preceding five-year period playing with detonators was responsible for 8 deaths and injury to 154 persons, nearly always children or lads. One can only speculate what lives might have been saved or disablement avoided, had all persons having detonators in their charge been careful to keep them in locked receptacles.

APPENDIX A

Factories Licensed to Manufacture Explosives in 1935

| Owner | Location of factory | General nature of product | Remarks |
|---------------------------------------|---------------------------|--|------------------------------|
| Canadian Industries, Ltd..... | Beloeil, Que..... | Blasting explosives, black powders, propellants. | |
| Canadian Industries, Ltd..... | James Island, B.C..... | Blasting explosives, black powders. | |
| Canadian Industries, Ltd..... | Nobel, Ont..... | Blasting explosives. | |
| Canadian Industries, Ltd..... | Brainerd, Man..... | Blasting explosives. | |
| Canadian Industries, Ltd..... | Brownsburg, Que..... | Ammunition, detonators, etc. | |
| Canadian Safety Fuse Co..... | Brownsburg, Que..... | Safety fuse. | |
| T. W. Hand Fireworks Co., Ltd. | Dixie, Ont..... | Fireworks. | |
| Toronto Fireworks Co., Ltd... | Islington, Ont..... | Fireworks..... | Operation ceased. |
| B. Marroni..... | Ville St. Pierre, Que. | Fireworks..... | Operation inter- mittent. |
| Macdonald Metal Products Co., Ltd. | Waterloo, Que..... | Toy pistol caps. | |

APPENDIX B

Production of Explosives in Canadian Factories during the Year 1935

| — | Quantity |
|---|--------------------------|
| Class I. Gunpowder..... | 84,104 lb. |
| “ II. Nitrate mixtures..... | 1,225,405 “ |
| “ III. Nitro-compounds— | |
| Division 1..... | 47,296,564 “ |
| “ VI. *Ammunition— | |
| Division 1— | |
| Safety cartridges..... | 128,681,125 |
| Safety fuse..... | Output of one factory. |
| Railway torpedoes..... | Output of one factory. |
| Percussion caps..... | Output of one factory. |
| Division 3— | |
| Detonators and electric detonators..... | Output of one factory. |
| “ VII. Fireworks— | |
| Division 2..... | (approx. value) \$88,000 |

*Exclusive of artillery ammunition but includes small arms ammunition made in Government factories.

APPENDIX C

Explosives Imported into Canada, January 1 to December 31, 1935

| Class | Division | Description | Quantity |
|-------|----------|--|--------------------------|
| II | | Nitrate mixtures..... | 2,125 lb. |
| III | 1 | Mixtures containing liquid nitro-compound..... | 41,618 " |
| | 2 | Nitro-compounds:— | |
| | | (a) Propellants..... | 102,929 " |
| | | (b) For use in explosives factories..... | 164,761 " |
| | | (c) For other manufacturing purposes..... | 1,036,242 " |
| V | 1 | Fulminate of mercury..... | 3,000 " |
| VI | 1 | Percussion caps..... | 390,500 |
| | 2 | Safety fuse..... | 3,000 feet |
| | 2 | Miners' squibs..... | 101,000 |
| | 3 | Detonating fuse..... | 186,126 feet |
| | 3 | Detonators and electric detonators..... | 9,287 |
| | 2 | Fuses (whaling)..... | 3,109 |
| VII | 2 | Manufactured fireworks..... | 238,000 lb. (approx.) |

APPENDIX D

Accidents from Explosives during the Calendar Year 1935

| Circumstances or Cause | Mines and Quarries | | | Elsewhere | | | Total | | |
|--|--------------------|--------|-----------|-----------|---------|-----------|-----------|--------|---------|
| | Number of | | Accidents | Killed | Injured | Number of | Accidents | Killed | Injured |
| | Accidents | Killed | | | | | | | |
| <u>In Use—</u> | | | | | | | | | |
| (a) Prematures, and failing to get away from the shot hole. | 15 | 8 | 13 | 7 | 3 | 6 | 22 | 11 | 19 |
| (b) Firing by electricity when persons are at the shot hole. | 6 | ..... | 6 | 1 | 2 | 1 | 15 | 1 | 14 |
| (c) Not taking proper cover. | 2 | ..... | 13 | 9 | 1 | 8 | 27 | 3 | 28 |
| (d) Projected debris. | 11 | ..... | 8 | 10 | 3 | 15 | 18 | 3 | 15 |
| (e) Handfires, and returning too soon to shot hole | 8 | ..... | 4 | 1 | ..... | 7 | 4 | ..... | 5 |
| (f) Tampering with misfired shots. | 3 | ..... | 2 | 1 | ..... | 1 | 1 | 3 | 3 |
| (g) Ramming or stemming the charge. | 2 | ..... | 2 | 1 | 3 | ..... | 3 | 1 | 4 |
| (h) Sparks, flame, etc. | 2 | ..... | 1 | 1 | 3 | ..... | 5 | 7 | 9 |
| (i) Boring into unexploded charge. | 4 | ..... | 6 | 3 | 2 | 3 | 2 | 3 | 3 |
| (j) Striking unexploded charge in removing debris. | 1 | ..... | 1 | 1 | 2 | 2 | 1 | 7 | 3 |
| (k) Preparing charges. | 4 | ..... | 1 | 3 | 3 | 2 | 1 | 4 | 4 |
| (l) Lighting fuse before inserting charge. | 1 | ..... | 1 | 1 | 3 | ..... | 3 | 2 | 3 |
| (m) Fuses. | 2 | ..... | 3 | 1 | 2 | ..... | 2 | 1 | 2 |
| (n) Springing or socketing shots. | 6 | 7 | 6 | 7 | 5 | 6 | 13 | 12 | 12 |
| (p) Various. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| In Manufacture..... | 65 | 22 | 65 | 68 | 16 | 60 | 133 | 38 | 125 |
| In Keeping..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| In Conveyance (other than by railway)..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Miscellaneous— | ..... | ..... | ..... | ..... | ..... | ..... | * | ..... | ..... |
| (a) Playing with detonators. | ..... | ..... | ..... | ..... | ..... | ..... | 21 | ..... | 23 |
| (b) Playing with other explosives. | ..... | ..... | ..... | ..... | ..... | ..... | 17 | 2 | 20 |
| (c) Various. | ..... | ..... | ..... | ..... | ..... | ..... | 5 | 3 | 5 |
| Totals, all circumstances..... | 65 | 22 | 65 | 68 | 16 | 60 | 176 | 43 | 173 |

* Except for these, the accidents given in this table occurred in circumstances not directly controlled by the Act.

** Circumstances are given on next page.

APPENDIX D—Continued
Playing with Detonators

| Cause of Accident | Killed | Injured |
|---|--------|---------|
| Boy, age 6, found a detonator, near his home. He threw it on the stove. The resulting explosion tore away one finger and mutilated the others of his right hand..... | | 1 |
| Boy, age 11, tried to remove composition from a detonator with a pin. It exploded. He received injuries which necessitated the amputation of one finger of his left hand..... | | 1 |
| Girl, age 11, while playing with a detonator, brought it in contact with hot ashes. It exploded, blowing off four fingers of her right hand. Her young brother had his leg injured by pieces of metal..... | | 2 |
| Two boys found detonators among rubbish, being removed from a cellar to the dump. One boy applied a match to a detonator, causing it to explode. He was burned about the face and legs. The other boy had minor injuries..... | | 2 |
| Boy, age 10, found a detonator on a lake shore. He applied a match to it. The explosion shattered his hand and inflicted injuries to his face and chest..... | | 1 |
| Youth found detonators kept on beam of farm woodshed. He exploded one while playing with it. He lost four fingers of right hand and was also cut about the head and chest..... | | 1 |
| Boy found several detonators in a coal car. He applied a light to one. He received serious burns to his face and body when it exploded..... | | 1 |
| Boy, age 12, while playing with a detonator, which he found on his father's farm, caused it to explode. He lost two fingers and thumb of his right hand..... | | 1 |
| Boy found two detonators in an old puzzle near scene of a fire. He tried to remove the composition. He lost three fingers of left hand..... | | 1 |
| Boy, age 12, found a detonator, which he thought to be an empty cartridge case, and struck it with a hammer. He lost three fingers of his left hand by the explosion which followed..... | | 1 |
| Boy, age 6, took a box of detonators belonging to a contractor who did not have them properly stored in locked box. While playing with them one exploded. He was seriously injured about the face and body..... | | 1 |
| Youth, roused from bed to answer fire bell, lit his lamp and threw match on a detonator which exploded. He lost three fingers of his left hand..... | | 1 |
| Boy, age 10, found a box containing ten detonators near a mineral claim. He placed one on a rock and struck it with a stone. He lost two fingers and thumb of left hand by the explosion which followed..... | | 1 |
| Boy, age 16, found a detonator while searching for spare bicycle parts on a garbage dump. He thought to remove the composition by burning it out. The explosion which followed caused the loss of all fingers of left hand..... | | 1 |
| Boy, age 15, took a detonator from cardboard box kept on sideboard in his father's house. He placed it on top of kitchen stove. He lost three fingers of left hand by the explosion which followed..... | | 1 |
| Boy, age 15, took from an open box in a quarry, one stick of dynamite and two detonators. He placed the detonators on a stone and applied a match. They exploded. He lost three fingers and the sight of both eyes..... | | 1 |
| Five accidents, of which details are not known, occurred when boys were playing with detonators:— | | |
| Boy, age 10, lost tip of one finger of left hand and other injuries to face and hands..... | | 1 |
| Boy, age 13, lost two fingers of left hand and eye injured..... | | 1 |
| Boy, age 9, lost three fingers of left hand..... | | 1 |
| Boy, age 10, lost four fingers of right hand..... | | 1 |
| Boy, age 13, lost two fingers and right eye..... | | 1 |
| | | 23 |

APPENDIX D—Continued
Playing with Other Explosives

| Cause of Accident | Killed | Injured |
|--|--------|---------|
| Powders:— | | |
| Youth, age 18, with companion made a chlorate-sulphur mixture and filled section of lead pipe with it and formed a fuse with a piece of string. He lit the fuse, then thinking it had gone out picked up the bomb. It exploded in his hand. Right hand had to be amputated. Left hand and face lacerated..... | | 1 |
| Boys, ages 14, 13, 8 (Indians) entered a shack on the reserve and found a beer bottle said to be three quarters full of gunpowder. One boy lit a match and dropped it into the bottle. He was badly burned about the face and arms. The two others escaped injury. Storage conditions strengthened a suspicion that the powder was damp..... | | 1 |
| Boy, age 14, was severely burned about the body, hands and legs when a playmate dropped a firecracker into his pocket in which was a bottle of gunpowder..... | | 1 |
| Dynamites:— | | |
| Three boys, ages 10, 7, 5 entered the magazine of a brick company. They took an electric detonator and one stick of dynamite. They exploded the dynamite correctly using battery, but did not take cover. The eldest boy died from injuries received. The others sustained minor injuries..... | 1 | 2 |
| Man, age 53, lit the fuse attached to blasting powder intending to explode it near a neighbour's house as a prank. It exploded in his hand..... | | 1 |
| Ammunition:— | | |
| Youth, age 17, exploded a .303 cartridge when trying to cut out the primer. A hole was blown through his left hand..... | | 1 |
| Boy, age 5, watched a playmate place a .22 R.F. cartridge on a stone and hammer it with a rock. It exploded and a piece entered his right eye..... | | 1 |
| Fireworks:— | | |
| Girl, age 4, set fire to her clothes when igniting a sparkler and died from the effects of burns..... | 1 | |
| Boy, age 12, ignited a firecracker in a milk bottle. He was cut about the face by broken glass..... | | 1 |
| Boys ignited fireworks displayed in a store. Two boys and the clerk were overcome by the fumes. The latter also received slight head injury..... | | 3 |
| Boy, age 7, picked up an unexploded bomb at a fireworks display and set a match to it. He lost two fingers of left hand..... | | 1 |
| Boy, age 15, sustained severe eye injury by explosion of a cracker he was lighting..... | | 1 |
| Boy, age 7, was injured in the eye by the explosion of a cracker which had lodged in a companion's sweater..... | | 1 |
| Boy, age 8, sustained severe injury to an eye when hit by a thrown cracker | | 1 |
| Two boys, ages 11, were injured by explosion of a cracker close to their faces..... | | 2 |
| Boy, age 11, was injured by explosion of cracker which had lodged in neck of his sweater..... | | 1 |
| Boy, age 13, sustained injuries to thigh by the explosion of fireworks in his pocket into which a lighted cracker had been tossed..... | | 1 |
| | 2 | 20 |

APPENDIX D—Concluded
Various Accidents

| Cause of Accident | Killed | Injured |
|--|--------|---------|
| Youth, age 17, while in the kitchen of his home with younger brothers and sisters, saw on the floor what he thought was a cartridge, but which probably was a detonator. He picked it up and to destroy it for safety was pushing it through a small hole in the stove when it exploded. He lost thumb and first two fingers of left hand..... | | 1 |
| Woman, age 80, was replenishing fire in kitchen stove with wood chips when an explosion wrecked the stove. She was severely cut about the face with debris. It is believed that a detonator was among the wood chips used..... | | 1 |
| Boy, age 16, found an old shell on river bank. While playing with it he let it fall on a stone. The shell exploded. The boy received severe injuries..... | | 1 |
| Man when lighting his furnace noticed what he thought was a rag among the coals. There was an explosion. He was injured in ear and leg. Wire, afterwards identified as belonging to an electric detonator, was found in the debris..... | | 1 |
| Man was sharpening pick at blacksmith forge when there was an explosion. He received injuries to his eyes. He claimed a detonator must have been in the coal he was using to stoke his forge..... | | 1 |
| Three men were drowned following the destruction of their canoe, evidently caused by an explosion. They had been dynamiting fish..... | 3 | ..... |
| | 3 | 5 |

APPENDIX E

Authorized Explosives

Explosives manufactured by Canadian firms as hereunder detailed:—

Canadian Industries, Ltd.

Polar dynamite—25, 30, 35, 40, 50, and 60 per cent.
 Polar Mineite—35, 40 per cent.
 Polar Ammonia Dynamite—20, 25, 30, 35, 40, 50, and 60 per cent.
 Polar Stopeite—20, 25, 30, 35, 40, 50, 55, and 60 per cent.
 Polar Gelatinized Dynamite—50, 60, and 75 per cent.
 Polar Forceite Gelatin—30, 35, 40, 50, 60, 75, 80, and 90 per cent.
 Giant Gelatin—20, 25, 30, 35, 40, 50, 60, 75, 80, and 90 per cent.
 Polar Monobels, Nos. 4, 6, 7, 12, and 14.
 Polar CXL-ite No. 2.
 Polar Cilgel.
 Gelatin Dough.
 C. X. L. Special Gelatin No. 1.
 C. X. L. Special Dynamite No. 1, No. 2, and No. 3.
 Polar Stumping No. 1 and Extra
 Blastol.
 S. N. G.
 Gypsumite "A" and "B."
 Cordite.
 Black Blasting Powders.
 Black powder pellets.
 Gunpowder.
 Sporting powders.
 Safety fuse powders.
 Safety fuse lighters.
 Signal bombs.

Canadian Safety Fuse Co., Ltd.

Safety fuse—"Clover" brand.
 Safety fuse—"Black Clover" brand.
 Safety fuse—"Beaver" brand.
 Safety fuse—"White Jacket" brand.
 Safety fuse—"Crown" brand.
 Safety fuse—"Moose" brand.
 Safety fuse—"Pacific" brand.
 Fuse lighters.

Canadian Industries, Ltd. (Dominion Ammunition Divn.)

Ammunition.
 Detonators.
 Lead Azide.
 Lead Trinitroresorcinate.
 Percussion caps.
 Railway torpedoes.
 Electric detonators.
 Railway fuses.

All explosives on the British authorized list are provisionally authorized in Canada, and in addition those manufactured by the following firms, as detailed below:—

American Powder Co., Maynard, Mass.
 American R.C. 22 short.
 Atlas Powder Co., Wilmington, Del.
 Electric blasting caps, Nos. 6, 7, and 8.
 Blasting caps, Nos. 6, 7, and 8.

Nitrocellulose.
Trinitrotoluene.

Brücker and Zinke, Meissen, Germany.
Safety fuse—"Globe" brand.

Brücker and Zchetzsche, Minden, Germany.
Safety fuse—black fuse "Triumph" brand.
Safety fuse—white fuse "Triumph" brand.

California Cap Co., Oakland, Cal.
Detonators.

Central Railway Signal Co., Boston, Mass.
Railway torpedoes.
Railway fusees.

Dunmore National Chemical Co., Seattle, Wash.
Regina stumping powder Nos. 1 and 2.
Regina rock powder Nos. 1 and 2.

E. I. Dupont de Nemours & Company, Inc., Wilmington, Del.
Dupont bulk rifle powders (Nos. 80, 92).
Dupont smokeless shotgun powder.
Dupont pistol powders Nos. 5 and 6.
Dupont sporting rifle powders.
Ballistite smokeless shotgun powder.
Improved military rifle powders.
Dupont dense smokeless shotgun powder.
Fulminate of mercury.
Guncotton.
Trinitrotoluene.
Tetryl.
Dynamite and blasting gelatin.
Agritol.

Ensign Bickford Co., Simsbury, Conn.
Cordeau-Bickford fuse.
Pull wire fuse lighters.

Hercules Powder Co., Wilmington, Del.
Bullseye revolver powder.
Hercules smokeless rifle powder.
Hercules smokeless shotgun powder.
Infallible smokeless shotgun powder.
Dynamite and blasting gelatin.

Illinois Powder Manufacturing Co., St. Louis, Miss.
Ammonia dynamite—40 and 60 per cent.
Powertol No. 1 and No. 3.

Independent Eastern Torpedo Co., Findlay, Ohio.
Nitroglycerine.

King Powder Co., King's Mills, Ohio.
Semi-smokeless powder.

Maison Farman, Billancourt, France.
Farman airplane starting cartridge.

Poudreries Reunies, Brussels.
Safety fuse—"Shamrock" brand.

John R. Powell, Plymouth, Pa.
Miners' squibs.

Safety Mining Co., Chicago, Ill.
Cardox.

Trojan Powder Co., Allentown, Pa.
Trojan blasting CC.
Trojan TL 502
Trojan 35 per cent standard.
Trojan 40 per cent standard.
Trojan 40C.
Trojan 50C.

United Railway Signal Corporation, Newton, Mass.
Railway torpedoes.

Western Cartridge Co., East Alton, Ill.
Detonators.

Authorized Explosives (Manufactured Fireworks)

Manufactured fireworks on the British authorized list are provisionally authorized in Canada.

All fireworks as manufactured by the following Canadian makers are authorized:

Macdonald Metal Products Company, Ltd., Waterloo, Que.
Marroni, Berardo, St. Pierre, Que.
Toronto Fireworks Co., Ltd., Islington, Ont.
T. W. Hand Co., Ltd., and Dominion Fireworks Co., Dixie, Ont.

Certain fireworks manufactured by the following foreign makers are authorized:

Germany:

Blumberg and Co., Dusseldorf.
Eisfeld, J. F., Silberhutte, Anhalt.
Eckhardt, C. F., Nuernberg.
Fischer, Wilhelm, Worbis, Wurtemburg.
Geb. Weinrich, Worbis, Thuringen.
Gerka-Werke, Offenbach on Main.
Hamburg-Bremer Handelsgesellschaft, Hamburg.
Nicolaus H. and Co., Memingen, Thuringen.
Trummer and Co., Hamburg.
Wickes, Fred, Barmen.

Japan:

Hirono Shoten, Kobe.

United States:

American Fireworks Co., Boston, Mass.
Antonelli Fireworks Co., Rochester, N.Y.
Backes, M. Sons Inc., Wallingford, Conn.
Burke and James Inc., Chicago.
Central Railway Signal Co., Boston, Mass.
Continental Fireworks Manufacturing Co., Dunbar, Pa.
Coston Supply Co., New York.
Edmiston Manufacturing Co., Columbus, Ohio.
Edwards Co., Cincinnati.
Essex Specialty Co., Berkeley Heights, N.J.
Federal Buster Corporation, Pittsburgh.
Hitt Fireworks Co. Inc., Seattle.

International Fireworks Co., New York.
International Flare Signal Co., Tippecanoe City, Ohio.
Jedel, A., Newark, Del.
Kilgore Manufacturing Co. Inc., Westerville, Ohio.
Los Angeles Fireworks Co., Los Angeles.
Marshall, John C., Brooklyn, N.Y.
National Fireworks Inc., West Hanover, Mass.
New Jersey Flugent Co., New Brunswick, N.J.
Norman Willets Photo Supply Co., Chicago.
Potts Fireworks Display Co., Franklin Park, Ill.
Rochester Fireworks Co., Rochester, N.Y.
Safety Automatic Toy Co., Dayton, Ohio.
Standard Railway Fusee Corporation, Boonton, N.J.
Triumph Fusee and Fireworks Co., Elkton, Md.
Unexcelled Manufacturing Co., Inc., New York.
Victory Fireworks and Specialty Co., Elkton, Md.

Small Chinese fireworks and Chinese firecrackers with gunpowder composition, and not exceeding 4 inches in length and nine-sixteenth inch in diameter, are authorized when found to function satisfactorily on examination at port of entry.

